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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

DECEMBER 5, 1931

Teddy-Bear, Climb for Your Life!

See Page 360

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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? DO YOU KNOW THAT ?

A bullfrog tadpole does not mature for at least two years.

The highest waterspout ever recorded by the U. S. Weather Bureau was 5,104 feet high and was seen off New South Wales, May 16, 1898.

In a cemetery in Cologne, Germany, has been found a great deal of Roman glassware of rich colors, showing that Cologne was an early center of the glass industry.

The University of California has a 75-year-old woman student in its extension department, who has completed courses in French, German, and political science.

Molly Island, in Yellowstone National Park, is the most eastern breeding ground for the white pelican and at present has more than 250 nesting pairs.

Experiments show that there is no truth in the old fisherman's saying that talking will scare away the fish.

The mineral pyrite got its name from a Greek word meaning fire, because sparks are produced when pyrite is struck with iron.

Wild ducklings are being killed off in considerable numbers by a parasitic disease transmitted from one duck to another by biting black flies and buffalo gnats.

A new, promising method of preventing fruit juices from becoming cloudy is based on action of an enzyme that does not affect starches and proteins in the juice.

In the London Pharmacopoeia for 1667 appeared the item that "a flead mouse dried and beaten to powder and given at a time, helps such as have diabetes."

About 30 varieties of soybean are grown commercially in the United States, but at the Government experimental farm at Arlington, Virginia, more than 2,000 varieties are grown.

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Science Service presents over the radio, an address

OUR FRIEND THE VOLCANO

By Prof. Robert W. Griggs, Head of the Department of Botany, George Washington University.

Friday, December 11, at 3:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSICS

Gravity and Electricity Are Merged in New Mathematics

Countryman of Einstein Uses New and Curious Geometry To Bring Together Diverse Fields of Physics

UNIFICATION of the laws of electricity and magnetism with those of the gravitational field, a problem upon which Prof. Albert Einstein and other mathematical physicists have been working, was given a possible solution by Prof. Cornelius Lanczos, visiting professor of Purdue University, who made his announcement before the American Mathematical Society meeting in Columbus, Ohio, last week.

This new "field-theory" promises to arouse great interest in science circles because of the recognized need of linking Einstein's theories of relativity with magnetism and electricity. Previous attempts, even those announced by Einstein some two years ago, have not been considered wholly successful.

Prof. Lanczos, who as professor at the University of Frankfurt, Germany, is a countryman of Prof. Einstein's, derived from the same principle two different functions, one of which leads to gravitation and the other to electromagnetism. Thus it appears that he has brought together the two diverse fields of physics that have heretofore developed so fruitfully along parallel lines.

The fascinating feature of Einstein's general theory of relativity, Prof. Lanczos said, was that it gave a satisfactory explanation of gravitation on purely geometrical grounds. For this purpose, a new and curious kind of geometry, called Riemann's geometry, had to be introduced into physics in place of the long-familiar Euclid's geometry.

Prof. Lanczos has made a further extension of the Riemannian geometry to physics. He makes the supposition that the "principle of least action," which has a very wide application in physical science, also exists in the Riemann space.

Two formulae result from this operation. One of these leads to the laws of gravitation, Prof. Lanczos said. The other gives the new and consistent explanation of the laws of electricity and magnetism.

Thus a new theoretical basis for physics has been set up which welds several diverse fields into a whole. Previous attempts to generalize Einstein's point of view with respect to electromagnetism have met with great difficulties, according to Prof. Lanczos.

"At present, however," he stated, "no evidence has appeared which would tend to show a probable connection between this field theory and modern quantum theory."

Science News Letter, December 5, 1931

PHYSICS

Electromagnetism Explained By Riemannian Geometry

By PROF. CORNELIUS LANCZOS of Frankfurt University and Purdue University

EDITOR'S NOTE: Prof. Lanczos explains that this problem can be really understood only by mathematical explanations. This review emphasizes the most essential features without becoming merely superficial. For people deeply interested in this matter, this summary can give a certain idea.

THE FASCINATING feature in Einstein's theory of general relativity is that some very general and logically satisfying points of view give a complete explanation of the physical phenomena of gravitation. The fundamental idea giving the key to the solution of the problem of gravitation was the introduction of a new kind of geometry called Riemannian geometry into physics in place of the Euclidian geometry. This geometry is governed by field-equations and corresponds in this way to the general feature of physics which is built up in its different branches upon field-equations. It was expected from the very beginning that electromagnetism must also have a place in this structure. It would be very clarifying if we could understand the peculiar character of "aether" to be an agency without any substance, if it should turn out that the laws of the aether are *geometrical* laws. Because even the absolutely empty space must be connected with a geometrical structure.

However, to generalize Einstein's point of view with respect to electromagnetism seemed to be connected with great difficulties. The fundamental quantity of the electromagnetic field, the field-intensity, shows a kind of symmetry which is not in accordance with the symmetry of Riemann's geometry. For this reason several attempts were undertaken to leave the Riemannian basis of geometry in order to construct a geometry upon a still more general basis. However, all these geometries do not possess the great inner consequence and logical necessity of Riemann's geometry. A really satisfactory solution by this means has never been found.

It seems that there also exists another way to find a solution of this problem. We can prove generally that Riemann's geometry is necessarily connected with a quantity which has a fundamental role in the theory of the electromagnetic field. It is not the electromagnetic field-strength but a quantity from which this can be deduced. This quantity appears

MEMORIAL TO COLUMBUS

Prize-winning design of a lighthouse and air beacon for the island Santo Domingo, the first land formally occupied by Columbus in the New World. It is the work of J. L. Gleave, of Nottingham, England, and because of its simple lines and stability against earthquakes won the $10,000 first prize in the international competition of the Pan-American Union. The memorial, together with a park and an airport, is expected to cost about $4,000,000.

as a necessary consequence of Riemann's geometry, when one only makes the supposition that there exists a "principle of least action" the domination of which we observe everywhere in physics. It is very surprising that choosing the simplest form of this principle in Riemann's geometry which is suggested by a very natural requirement, we find a combination of two functions, one of which leads to gravitation and the other to electromagnetism.

We considered here only the fundamental facts of electromagnetism, viz. those connected with the field. A later elaboration must show whether there exists a possibility of understanding the inner structure of matter through this new unification of gravitation and electricity. The reason for this is that the whole theory is based upon the idea that the equations which we have found are valid *everywhere*, without exception. The special character of "matter" can be understood only as a consequence of the fact that there are certain small regions in space where the field-intensity becomes very high and the usual approximation which is permitted in weak fields and which corresponds to the classical laws of the electromagnetic field, is no longer valid. These regions are to be considered as the representation of material particles. We can expect to explain in this way in particular the fundamental identity of the change of every electron, and possibly in general the existence of universal constants in nature.

At present no evidence has yet appeared which would tend to show a probable connection between this field-theory and modern quantum-theory.

Science News Letter, December 5, 1931

CHEMISTRY

Third Competitor Enters Race for Missing Element 87

BLINDNESS threatening Prof. Gustave A. Aartovaara of Helsingfors, Finland, in his search for the missing chemical element 87, has aroused the anxiety of scientists of the U. S. Bureau of Standards, who have been working with him in seeking one of the last two remaining building blocks of the universe. Glass fragments severely injured his eyes as a result of an explosion of his apparatus, reports state.

As a third competitor in the race to identify this elusive metallic element, Prof. Aartovaara of the Helsingfors Technical University, had sent a sample of his preparation to be examined by Dr. W. F. Meggers of the U. S. Bureau of Standards, whose report on the optical spectrum has just been announced. The announcement comes on the heels of a rival claim by Prof. Jacob Papish of Cornell University, who declared he found the missing alkali in the rare mineral samarskite. The third contestant for the honor of completing the chemists' periodic table is Prof. Fred Allison of the Alabama Polytechnic Institute, who first announced the discovery of the missing alkali about a year ago, through the use of a magneto-optic method of his own invention.

No specific evidence that the Finnish preparation actually contains number 87 has been found, Dr. Meggers announced, though the spectra of all the related alkali metals, including sodium and potassium, were found. The crucial lines in the optical spectrum, he declared, will lie in the infra-red region where investigation is troublesome. Only the X-ray spectrum, used by the Cornell scientists, can decide the question definitely, in Dr. Meggers' opinion.

On the other hand, Dr. Meggers doubts whether Prof. Papish has given convincing measurements actually proving the existence of number 87 in his extract.

Prof. Aartovaara's substance differs from those of Prof. Allison and Prof. Papish in that it is radioactive, as might be expected from its nearness to radium in the periodic table of chemical elements. The reported explosion that injured Prof. Aartovaara is believed to have been due to the action of the radioactive rays on the solution.

Chemists recall, however, that a radioactive alkali solution was examined in 1908 for the missing element by the German chemist, Ebler. None was found. The activity was due to a trace of a known radioactive element.

Similar hopes entertained by investigators about radioactive alkali preparations have all been unfulfilled in the past.

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ASTRONOMY

Faint Nebulae May be Most Distant Objects

A GROUP of faint nebulae, just visible through the large reflecting telescope of the Bergedorf Observatory, Hamburg, has been discovered by Dr. Walter Baade. He believes them to be considerably more distant than another group of faint nebulae, like those in the constellation of Ursa Major, the great bear, which he discovered several years ago. These have been shown, by astronomers at the Mt. Wilson Observatory, to be about 70 million light years distant.

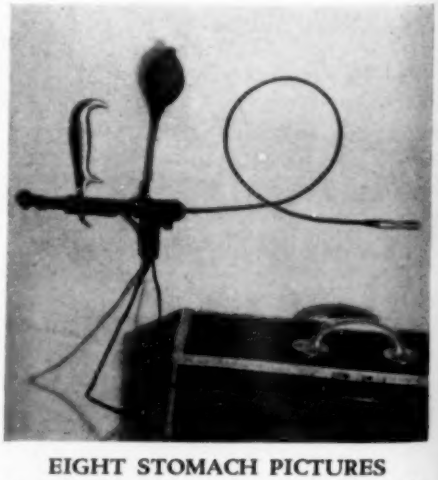
Only one more distant group of objects have been measured—some nebulae in the constellation of Leo, the lion—which appears to be about 105 million light years away. If the Ursa Major group is more than this, it will be the most distant object known to astronomers. The newly discovered nebulae are within a distance of about half a degree, the diameter of the moon, of the star Merak, the pointer farthest from the pole star, at the corner of the great dipper diagonally opposite the handle.

Science News Letter, December 5, 1931

MEDICINE

Camera and X-Rays Used to Locate Ulcers in Stomach

A COMBINATION of X-rays and a tiny camera which is lowered into the stomach now gives the physician or surgeon a means of determining more exactly the location of ulcers or other lesions in the stomach, Dr. P. E. Thal



EIGHT STOMACH PICTURES

Are taken within the little bulb on the end of the spiral tube after it has been inserted in the organ.

of Chicago told members of the Radiological Society of North America.

The camera consists really of two cameras, one above and one below an illuminating bulb, Dr. Thal explained. The whole arrangement is small enough to be passed into the stomach easily. A flexible tube from the camera carries the manipulating mechanism. Each camera has four film chambers arranged so that tiny photographs are made of four sides of the stomach walls. Thus eight pictures may be made at one time, covering the entire interior area.

By means of the X-ray, the physician can see the camera in the stomach and guide it to the best place to take the pictures. When all is ready, the exposure is made by opening the shutter and flashing the light. The picture tells the surgeon just where he may expect to find the ulcer he wishes to remove.

Science News Letter, December 5, 1931

GEOGRAPHY

Uncle Sam's Coast Surveys Speeded Up by Airplane

SHORE LINES of the Atlantic and Gulf coasts, with their complicated inside waterways, are being mapped at one-third to one-fifth the former cost, the annual report of the director of the U. S. Coast and Geodetic Survey reveals. Airplane photography is the secret.

Over territory where ground crews plod laboriously for months, a plane sweeps in a single day. Constant revision of these charts necessitated by harbor developments and shifting sands, helps to make the air-photo scheme twenty to thirty per cent. more efficient than the old ground methods.

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SOCIOLOGY

Irish Immigrants Becoming Emigrants

THE IRISH immigrant is now an emigrant.

Statistics of emigration for the first six months of this year show that during that time the number going to the "Old Country" outnumbered by 604 those coming to the United States, it is indicated by a report in the current issue of *Eugenical News*.

Two possible reasons are suggested for this turn of events: the economic depression, which has discouraged migration; and the legal restrictions imposed by the United States.

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THREE MAGIC LANTERNS IN ONE

The sun eclipse projector and its designer, James Stokley, associate director of the Franklin Institute Museum, Philadelphia. This machine will speed up the motion of the moon sixty times.

ASTRONOMY

New Projector Will Produce Eclipses of Sun on Demand

VISITORS to the new Franklin Institute Museum, now being erected in Philadelphia, will be able to see eclipses of the sun at any time with the aid of a new projector. The machine was constructed by the Bausch and Lomb Optical Company after the design of James Stokley, associate director of the Museum in charge of astronomy. It shows partial, annular and total eclipses, the latter with the Baily's beads, spots of light visible at the beginning and end of a total eclipse and caused by the sun's light shining through valleys on the edge of the moon, as well as the corona. The latter is the outer layer of the sun, visible only at eclipse time, and appears as bright streamers.

The machine makes use of three projectors, each similar to an ordinary magic lantern. The center one projects a circular spot of light, representing the sun. In front of the circular hole which forms this spot revolves a glass disc to which are attached a series of smaller discs, approximately the size of the hole. One disc crosses the hole to one side, producing a partial eclipse. The next one crosses the hole centrally, but is somewhat smaller than the hole. This gives the effect of the annular eclipse, such as occurs when the moon is a little farther from the earth than at most eclipses, and a ring, or "annulus," of sunlight is seen around the moon. The third disc completely covers the hole, and as it does so, one of the other projectors flashes on momentarily, to show the Baily's beads. This quickly fades into the corona, which remains visible for several seconds. Then the Baily's beads reappear, but on the opposite side of the sun, and then they fade into the returning crescent of sunlight, which gradually increases until the uneclipsed sun is again shining. After that, the entire cycle is repeated, over and over.

A small motor operates the mechanism, which moves at a rate such that the normal motion of the moon is speeded up approximately 60 times. Several cams operate mercury switches which turn on the outer lanterns at the right time, and automatic irises which cause the fade-in from Baily's beads to corona and back.

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ASTRONOMY

Magnificent Orion

Changing Skies Bring Famous Constellation Above Horizon So That it Can be Observed Early in the Evening

By JAMES STOKLEY

THOUGH the astronomer, like other people, makes use of a calendar in his daily life, such a device is not necessary for him. The starry skies reveal the changing seasons to those who know them. Look to the southeast this evening, about nine o'clock. About a third of the way from the horizon to the zenith are three bright stars, in a vertical row. Two stars, of even greater brilliance, are seen to the right and to the left, while just above the row of three is still another bright star. Descending downwards, and to the right, from the lowermost star of the set of three, is a line of fainter stars, and, if the night is dark, and you are away from the glare of city lights, one of these appears slightly hazy.

This group of stars, of course, is the constellation of Orion, generally considered as the most magnificent of all groups in the sky. In the summer it does not come well above the horizon until long after most of us have gone to bed. But the constellation changes its habits during the winter and is now beginning to appear high up in the sky in the early evening.

To the ancients Orion represented a warrior, with a lion skin over one arm, an upraised club in the other hand, and a sword hanging from his belt. The three stars in a row form the belt. The upper one is called Mintaka, the middle one Anilam and the lower Alnitak. Each of these stars is of the second magnitude. The curved row of fainter stars extending downwards from Alnitak forms the sword, while the hazy patch, revealed better through even a small telescope, is the Great Nebula of Orion, a vast cloud of glowing gases.

The bright star to the left of the belt has a slightly reddish color, and is called Betelgeuse. The astronomer, however, usually discards these ancient names, many of which are derived from the Arabic, and to him this star is alpha Orionis, which means that it is the brightest star in the constellation of Orion. This system of designating stars by letters of the Greek alphabet, in order of brightness, followed by the Latin name of the constellation, in the genitive case, was introduced in the year 1603, by Johann Bayer, a Bavarian attorney who was interested in astronomy, and who published in that year a famous set of star maps.

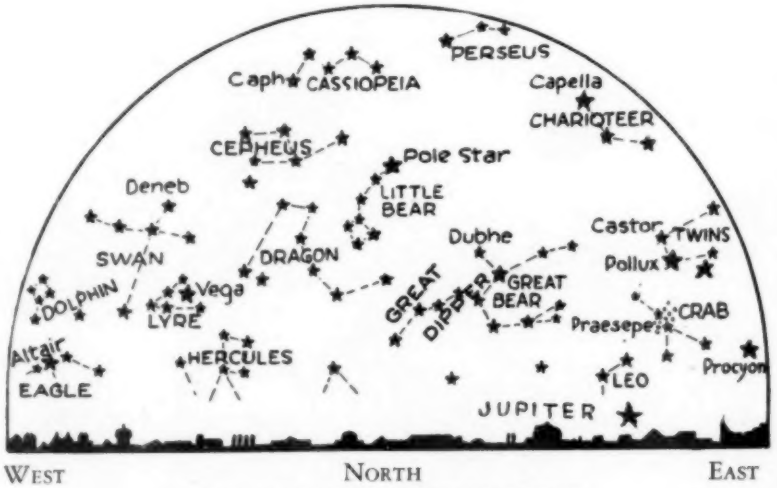
Second brightest star in Orion, and therefore known scientifically as beta Orionis, is the one to the right of the belt. Rigel is its common name, and it marks the warrior's lifted left foot. Like Betelgeuse, it is of the first magnitude. The star above the belt is of the second magnitude, and called Bellatrix, or gamma Orionis, because it is the third brightest star of the constellation. Mintaka, Anilam and Alnitak are designated, respectively, as delta, epsilon and zeta Orionis.

The Bull's Red Eye

Now look above Bellatrix, and you will see a bright star distinctly red in color. It is not hard to imagine this star as the baleful eye of some huge animal and the ancients must have had some such idea, for this marks the eye of the bull, Taurus. Orion is about to smite him with his club. Aldebaran is the name of the star, and a little above it is a famous cluster of fainter stars, the Pleiades. Though legend has it that there were once seven stars visible to the naked eye in this group, it is now generally possible to see only six. But with a small telescope or even a pair of opera glasses, many more are visible. A long exposure photograph, through a powerful telescope, reveals several thousand stars in the region, and shows that they are enveloped in a cloud of nebulosity. Apparently this is an opaque cloud, and we see it illuminated by reflected light from the stars that comprise the cluster.

Orion is not alone as he goes forth to fight the celestial bull, for his two faithful dogs accompany him. Directly under the constellation is one, Canis Major, the great dog, marked by the "dog star," Sirius, brightest of all the stars in the sky. The star is supposed to represent an ornamental jewel on the dog's collar, but, like most of the constellations, it is hard for us moderns to see any resemblance between the grouping of the stars and the object indicated. The other, and lesser dog, Canis Minor, is to the left and a little higher in the sky. Another very brilliant star, Procyon, marks this group.

Above Canis Minor is the constellation of Gemini, the twins, In the northern part of the constellation are the two stars representing the two boys. These are Castor and Pollux. At present Pollux, the brighter of the two, is lower in the sky than his brother. Now look above Gemini, and you will see Auriga,



POINTING TO THE DEMON STAR

Follow the western edge of the "A" of Perseus to the moderately bright star, Algol, shown on the other map. Algol is really two stars which eclipse each other to cause its light to brighten and dim regularly.

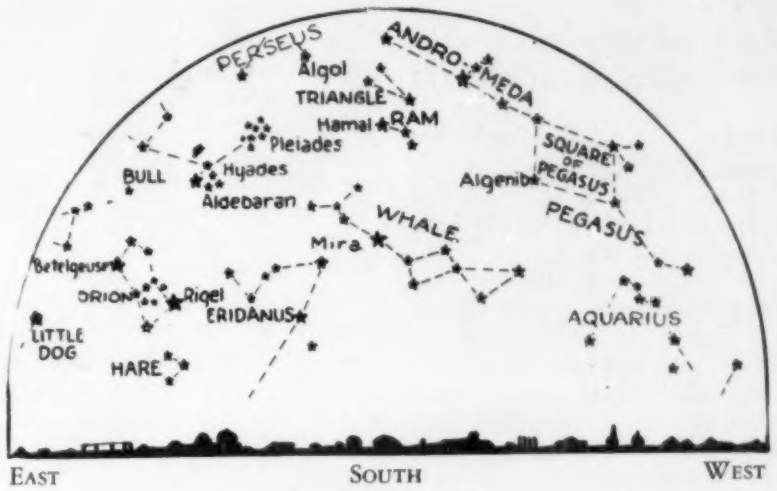
the charioteer, marked by the brilliant star Capella.

In the west is the Great Square of Pegasus, a familiar "landmark" in the study of the sky. Pegasus is the winged horse used by Perseus, and his head, shoulders and forefeet are represented. As he stands now in the western evening sky, he is taking a nose dive towards the horizon. The uppermost star of the square is not actually in Pegasus, but in the next-door constellation of Andromeda, who was the lady chained to the rock. No very bright stars mark this group, which extends in a line towards the zenith. Above her, and directly overhead, is Perseus himself.

Algol, the Demon Star

The stars of Perseus form a pretty good letter A, with a point of the letter toward the northwest, and next to the W-shaped constellation of Cassiopeia. The western edge of the A points to the south, and at its southern end are two moderately bright stars, one of the second magnitude and the other of the third, a little fainter. The fainter one is at the southern end of the row of stars. The brighter of the two stars is called Algol, and is sometimes known as the "Demon Star." To find the reason for this strange appellation, watch Algol for several nights. Most of the time it is brighter than its neighbor to the south, rho Persei. But if you look at it on the evenings of December 9, 12, 15, or 29, you will see that it is much fainter than usual, scarcely brighter than rho. If you continue to watch it, on into the night, you will find that it will begin to brighten, and, after a few hours will be shining with full brilliancy, as if nothing had happened!

The cause of this periodic diminution in the light of Algol is no more mysterious than the darkness that comes over the earth when the sun is obscured by the moon during a total eclipse. In fact, it is caused in just the same way, and Algol is known as an "eclipsing variable." Algol is not really a single star, but double, the two orbs revolving around their center. One member of the pair, however, is very faint, though it is the larger of the two. It happens that the earth is close to the plane in which they move, so once in each revolution the darker star partially eclipses the brighter one, thus causing the diminution in light. Once in 68 hours and 49 minutes a revolution is completed. After the dark body starts to obscure the bright one, it takes about 4½ hours before the time of minimum brightness is reached. It remains there for about 20 minutes, then another 4½ hour period is required for the star to wax to its usual brightness. Of course, the entire reduction in light frequently takes place in the daytime, when the star is not visible at all, but on the nights mentioned it occurs in the evening hours. On the ninth, the time of minimum is at 10:10 p. m., eastern standard time; on the twelfth, at 7:00 p. m.; on the fifteenth, at 3:50 p. m. and on the twenty-ninth, at 11:50 p. m.



TO FIND ORION

Face the south with this map before you and the stars will unfold themselves as they are represented on the diagram. Hence Orion will be found in the southeast about one-third of the way from the horizon to the zenith.

With the aid of the photoelectric cell, the magic lamp of modern science that has made possible both talking movies and television, astronomers have measured very accurately the variations in light of Algol. Prof. Joel Stebbins, of the Washburn Observatory of the University of Wisconsin has probably made the most extensive studies of this kind. The curves obtained by Prof. Stebbins, for example, show that there is a slight reduction in light at a point directly opposite to that of the principal minimum. This indicates that the fainter body is not entirely dark, because the total light is slightly reduced when it passes behind the brighter body. This change is too slight to be observed with the eye, even when aided by a telescope, but the electric eye, the photoelectric cell, reveals it.

Third Member Dark

Using these data, Prof. H. N. Russell, of Princeton University, has calculated the dimensions of the stars that make up the system we call Algol. He finds that the bright star is 1,250,000 miles in diameter, as compared with 1,450,000 miles for the faint one. The former has a mass only about three-eighths that of the sun, even though it is about 385,000 miles greater in diameter. The centers of the two orbs are 3,000,000 miles apart. But even this is not all, for the spectroscope, which can reveal the motion of a star towards or away from the earth, and which shows the motion of the bright star as it rotates around the darker body, also indicates that these two stars revolve, in a period of nearly two years, around a third and invisible body.

Below Perseus in the evening sky, towards the northwest, is Cassiopeia, the seated lady, with the stars arranged in the shape of a W. Below her is Cepheus, and still nearer the horizon is Cygnus, the swan, or the northern cross, which is now in an upright position. The bright star Deneb is at the top. To the right of Cygnus, just about to set, Lyra, the lyre, can be seen in the early evening, with the brilliant star Vega. In the northeastern sky, also close to the horizon, appears the great dipper, in Ursa Major, the Great Bear. The bowl of the dipper is now uppermost.

During December none of the planets are well placed for observation during the entire evening. Right after sunset Venus can be seen towards the west, in the gathering dusk. It sets about an hour and 45 minutes after the sun, but its great brilliance, of the minus 3.3 magnitude, should make it easily visible. Just above Venus, and setting a quarter of an hour later, is Saturn. This planet is considerably fainter, and may be hard to find, though it is brighter than any star in the vicinity.

ZOOLOGY

Protection Extended Nearly Extinct Teddy-Bears

See Front Cover

KOALAS, known colloquially in Australia as "native bears," real live teddy-bears in soft plush-like fur, have lately become the objects of special solicitude, both official and private, in the far island-continent that is their home. For several generations nobody paid any more attention to them than Americans pay to squirrels, for they were so numerous that it never occurred to Australians that they could ever become scarce. But a highly fatal epidemic got started among them some years ago, killing them by the thousands. Hunters also shot great numbers for their fur. So before it was fairly realized, Australia's live teddy-bears were dangerously close to the extinction line.

Official action, though dangerously delayed, has been vigorous, and may avail to save the survivors. Shooting koalas is now forbidden; though as with most such sweeping prohibitions there are not sufficient means for securing really complete enforcement.

Even more promising is the setting aside of well-supervised sanctuary areas, where not only these attractive marsupials but also other interesting but threatened native animals and plants can have a chance for their lives. One such area it Koala Park, near Sydney. This is managed by Noel Burnet, who supplied the appealing koala portrait that appears on the front cover of this issue of the SCIENCE NEWS LETTER.

Science News Letter, December 5, 1931

PHYSIOLOGY

Stimulating Climate Hard On Machinery of Body

A NEW understanding of the important effects which climate has on the health and bodily machinery of human beings was described by Dr. Clarence A. Mills of the University of Cincinnati College of Medicine at the meeting at New Orleans of the American Society of Tropical Medicine.

Although the stimulating climate of the northern and northwestern parts of the United States is popularly considered more healthful than the sluggish, semi-tropical climate of the South, Dr. Mills found that in some regions the climate appears to have too stimulating an effect on certain bodily processes.

Where the climate is most stimulating, Dr. Mills found that the death-rates from certain diseases, such as diabetes, exophthalmic goiter and Addison's disease, were highest. His theory is that in such regions the drive of the stimulating climate is forcing an increasing number of people to live at such a fast pace that their body machinery breaks down.

Suicides, the effect of mental breakdown, he also found to be most frequent where the climate is too stimulating.

In the stimulating areas of the North and Northwest humanity pays the price for its rapid industrial development in increasing breakdown of the bodily machinery as seen in the increasing deaths from diseases like diabetes, he said.

He advised that cases of mental or bodily breakdown should be sent south for treatment when possible, so that they might have the benefit of the lessened vigor of the climatic drive.

Science News Letter, December 5, 1931

FORESTRY

Would Send Unemployed To Clean up Forests

IF PUBLIC funds are made available for the relief of unemployed by taking care of hitherto neglected large-scale jobs this winter, there is plenty of work for several divisions of the army of the unemployed in the forests of America, cleaning them up to promote better growth of the valuable trees and reduce fire hazard. The use of relief-job funds in this way is advocated editorially in the current issue of the *Journal of Forestry*.

The writer of the article does not support the idea of using relief-job men for reforestation on a large scale, as has been suggested. He points out that too elaborate and time-consuming preparations would have to be made: gathering and planting seed, laying out nurseries, etc.; and that by the time all this work could be done the depression would very probably be over, and the whole program would perish, with great waste of money and work, for lack of further appropriations. On the other hand, it is pointed out, laborers can go into the woods for a clean-up program with almost no loss of time; they need not have as much skill as is required for a planting program; and a useful by-product in many places would be cheap cordwood for the use of the needy.

Science News Letter, December 5, 1931

IN SCIENCE

ARCHAEOLOGY

Stone Age Industry Was Highly Specialized

STANDARDIZATION in industry—finding the best sizes and shapes for pickle bottles, ror example, and then making all pickle bottles by that satisfactory pattern—is nothing new in the world's economic history. Back in the Old Stone Age, when the leading industry was turning out flint axes and knives, the stone tool and weapon business was standardized over wide territories.

This is the conclusion reported by Reid Moir, British archaeologist who has specialized in study of the stone implements left by Old Stone Age men.

Mr. Moir is now strongly inclined to the view that, at certain periods of the past, stone implements were being made on the same specialized plan over enormous areas of the earth's surface, having started from a common center.

Science News Letter, December 5, 1931

MEDICINE

Seeks Effects of Tropics On Rheumatic Fever

WOULD the tropics make a favorable place of residence for persons suffering from heart disease in a somewhat acute stage as a result of an attack of rheumatic fever? The answer to this question was sought from members of the American Society of Tropical Medicine living in the tropics by Dr. Louis F. Bishop and Dr. Louis F. Bishop, Jr., of New York City.

In a paper presented before the society these physicians pointed out the part played in the world's history by climate relations of disease. Vast areas of the world's surface cannot be utilized at the present time because the life of the inhabitants has always been threatened by prevailing disease.

The people of the tropics are said to be immune to inflammatory rheumatism. This prompted the inquiry of the New York physicians into the medical and economic advantage of removing to the tropics persons who had suffered from this disease.

Science News Letter, December 5, 1931

NCE FIELDS

ETHNOLOGY

Scientists Watch Changes In Living Maya Civilization

BY STUDYING living Mayas in the peninsula of Yucatan, science is beginning to catch glimpses of how civilization comes to groups of human beings. What has been learned so far, from observations in a Mayan Indian village, was reported by Dr. Robert Redfield, anthropologist of the University of Chicago, in a lecture at the Carnegie Institution of Washington.

Yucatan offers a laboratory where civilization can be observed in the making, Dr. Redfield explained. Not only do the Mayan inhabitants represent the entire range of social development from primitive tribe to modern city, but these groups in so many different stages of advancement are all being influenced by civilizing factors today, and it is possible to note how changes come.

The first village which has been studied is Chan Kom, near the ruins of the ancient Mayan city of Chichen Itza. The 250 people of Chan Kom are all Mayan Indians, representing a middle stage of progress. Chan Kom mixes old and new, often incongruously.

Native medicine men tell the people that sickness is brought by evil spirits or by angry gods, and the people have enough confidence in these explanations to consult the medicine man. But a sick person may also send to the town drug store for medicine.

Science News Letter, December 5, 1931

ETHNOLOGY

Indians Had War Gas, French Scientists Finds

POISON GAS warfare, regarded today as one of the developments of civilized, scientific fighting, was used by Indians of Canada back in the sixteenth century; and was regarded by the French explorers as something so barbarous that they tried to dissuade the redskins from such savage tactics.

As proof of the Indians' skill in handling this fighting technique, Prof. de La Ronciere, of the French Marine Academy, cites a description of Indian fighting written by Jacques Cartier, in 1536.

The Indians gathered quantities of faggots and cedar boughs, and heaped them up and saturated them with fat of the sea wolf and other fish and with some poisonous substance. Then, when the enemy attacked, the trick was to force them into a position where they would get full benefit of the wind-borne fumes. That maneuver completed, a torch was touched to the faggot heap from which rose the fumes, thick, black, and dangerous.

The fumes were not death-dealing, but did blind and suffocate the victims. Then the poison gas brigade, keeping safely out of the drift of the fumes, bore down on the enemy and took what toll they pleased.

Science News Letter, December 5, 1931

ARCHAEOLOGY

Scientist Takes Census of City Centuries Dead

TAKING A CENSUS of an American city that flourished 2,000 years ago is one of the newest feats of archaeological research, reported by Oliver G. Ricketson, Jr., of the Carnegie Institution of Washington, in a recent lecture at the Institution. Mr. Ricketson announced results of the latest explorations at the ruins of Uaxatun, in Guatemala, the oldest Mayan site so far discovered.

The census of Uaxactun was taken, not by counting heads in the usual manner of census taking, but by counting houses, Mr. Ricketson explained. The site of Uaxactun has at the center a plaza and pyramid-shaped monuments where Mayan priests and astronomers conducted religious ceremonies and watched the skies. Out from this civic and religious center radiated the residential section, so to speak, consisting of thatched huts surrounded by little farms. Even after so many centuries, the house mounds, or low platforms on which the huts were built, may still be seen and counted; and Mr. Ricketson said that a cross-section of the area has been examined by counting house mounds in different directions as far as ten miles out from the civic center.

There were 78 houses per square mile of habitable land, it has been determined. And, considering that ten miles is about as far as an Indian would walk to "go to town," Mr. Ricketson set that as the probable outside boundary. On this basis, Uaxactun had a population of about 48,000 Indians in its prime.

Science News Letter, December 5, 1931

PHYSIOLOGY

Smoking Found to Dull Man's Sense of Taste

IF YOU are a smoker, your breakfast orange does not have the sour tang that it would have for you if you were to forego the use of tobacco. Likewise pickles are not so sour. And the acid taste of souring milk is not so readily detected.

This effect of tobacco on the individual's threshold of taste, interesting to both physiologist and psychologist, was discovered at the psychological laboratories of the Catholic University of America, Washington, by Rev. Robert A. Boelcke who performed his experiments under the direction of Dr. J. Edward Rauth.

The acids used were: acetic, the familiar acid of vinegar, citric found in oranges and other citrous fruits, lactic acid found in milk, and hydrochloric, nitric, and sulphuric acids. Solutions of all these were prepared so that there would be a wide range in intensity.

Smoking dulls the taste for all these acids, the only exception being sulphuric acid. Sulphuric acid has a puckering effect on the mouth, and the investigators believe it may have been detected because of this astringent quality before it was actually tasted.

Science News Letter, December 5, 1931

PSYCHOLOGY

Mental Tests Used to Scale Man's Life Span

PSYCHOLOGISTS have now traced the changes in mental ability of man throughout the whole range of life from the time he is first old enough to take a mental test. The investigation has been conducted at Stanford University by Dr. Walter R. Miles.

More than eight hundred persons have been tested in this program, and the age range was from 6 to 95 years.

One of the tests given measured the ability to respond to an outside auditory signal with a certain movement of hand or foot. This is required every day of practically everyone, but is especially important to the motorist or, for that matter, the pedestrian.

In this ability and in most of those studied there is a fairly rapid increase through the years of childhood and early youth, a fairly long peak or crest representative of maturity, and then a slow, regular decline.

Science News Letter, December 5, 1931

ARCHAEOLOGY

Homes of Ancient Egypt

"A Classic of Science"

"They Sacrificed the Pleasure of Seeing Passersby to The Advantage of Never Being Seen From the Outside"

L'ARCHEOLOGIE EGYPTIENNE par G. Maspero. Paris, Maison Quantin, 1887. Translated for the SCIENCE NEWS LETTER *by Helen M. Davis.*

THE SOIL of Egypt, incessantly washed by inundations, is a black mud, compact, homogeneous, which on drying acquires the hardness of rock: the fellahs have used it from time immemorial to build their houses. Among the poorer, these are scarcely more than rudely shaped piles of earth. A rectangular space 2 or 3 meters wide by 4 or 5 long is enclosed by a wattling on palm branches, which they cover inside and out with a coat of mud; as this clay cracks when the water evaporates, they stop up the chinks and then spread on a new coat, until the whole has a thickness of 10 to 30 cm., then they stretch more palm branches mixed with straw above the room and cover over the whole with a thin layer of compacted earth. The height is variable: usually the ceiling is very low, and one cannot stand up suddenly for fear of getting a bump on the head; sometimes it is 2 meters from the ground, or even more. No window, no skylight where air, or light can come in; sometimes a hole, usually in the middle of the roof, lets the smoke out of the room; but that is a refinement by no means known to all.

Sun-Dried Brick

It is not always easy to distinguish at first glance which huts are mud-plastered and which are of unburnt brick. The common Egyptian brick is nothing but mud, mixed with a little sand and chopped straw, then made into oblong tablets and dried in the sun. The head workman digs vigorously in the place where it is desired to build; others carry away the clods and pile them in a heap, where some tramp them with their feet and reduce them to a homogeneous mass. When the paste is sufficiently ground up, the head workman runs it into molds of dry wood. They are then carried away by an assistant and taken out to dry in the air, arranged like a checkerboard, at a little distance from one another. Builders are careful to leave them in the sun half a day or a whole day, then they place them in a pile in such a way that the air may circulate around them freely, and do not use them for a week or two; others are content with several hours' exposure to the sun and use them while still damp. In spite of this negligence, the mud is so stiff that it does not lose its shape easily: when the face turned to the outside has nearly crumbled away under atmospheric influences, if we dig into the wall itself, we find most of the brick intact and distinguishable one from the other.

Fast Brick-Making

A good modern worker can mold a thousand bricks per day without fatigue; after a week of practice, he can make about 1,200, 1,500 or even 1,800. The ancient workers, whose tools did not differ from tools of the present, must have obtained results just as satisfactory. The mold which is generally used is 22x11x14 cm. for medium sized bricks, 38x18x14 cm. for large bricks; but larger or smaller shapes are not infrequently found in the ruins. The brick of the royal workshops was sometimes impressed with the cartouche of the reigning sovereign; those for private use have on the face one or more conventional designs traced in red ink, the imprint of the molder's fingers, or the seal of the maker. The greatest number have no mark to distinguish them. Burnt brick was not often used before the Roman era, except as flat or round tile. Enamelled brick seems to have been fashionable in the Delta. The most beautiful specimen which I have seen is that preserved in the museum of Boulaq, carrying in black ink the names of Rameses III; its enamel is green, but some other fragments are colored blue, red, yellow or white. . . .

The common people lived in veritable huts which, though built of brick, were worth scarcely any more than the hovels of the fellahs. At Karnak, in the Pharaonic town, at Kom-Ombo, in the Roman town, at Medinet-Habou, in the Coptic town, houses of this kind rarely have more than 4 or 5 meters frontage; they are built with a ground floor which is sometimes surmounted by some living quarters. The well-to-do people, merchants, secondary employees, heads of workshops, had somewhat larger rooms. Their houses were often separated from the street by a closed court: a long passageway, down the length of which the rooms were ranged. More often the court was lined with rooms on three sides; still more often the house presented its facade to the street. It then had a high wall painted or whitewashed, surmounted by a cornice, and with no opening except the door, or pierced irregularly by windows. The door was often of stone, even in unpretentious houses. The jambs project slightly at the sides, and the lintel is supported by a painted or sculptured gorge.

Interior Plan

Crossing the threshold one passes successively through two little dark rooms, the last of which leads into the central court. The ground-floor ordinarily served as a stable for the donkeys or the cattle, as a granary for wheat and provisions, as cellar and kitchen. Wherever the upper floor still exists, it reproduces almost without modification the arrangement of the ground floor. It was reached by an exterior stairway, narrow and steep, broken at frequent intervals by little square landings. The rooms were oblong and received light and air only by the door: when it was decided to cut windows to the street, they were airholes placed almost at the height of the ceiling, without regularity or symmetry, adorned with a sort of wooden grill spaced like bars, and closed by a solid shutter. The floors were brick or flagstone, or very often formed of a bed of trodden earth. The walls were whitewashed, sometimes painted in vivid colors. The roof was flat and probably made as it is today of palm branches laid one over the other, and covered with a layer of earth thick enough to resist the rain. Sometimes it was surmounted only by one or two of the

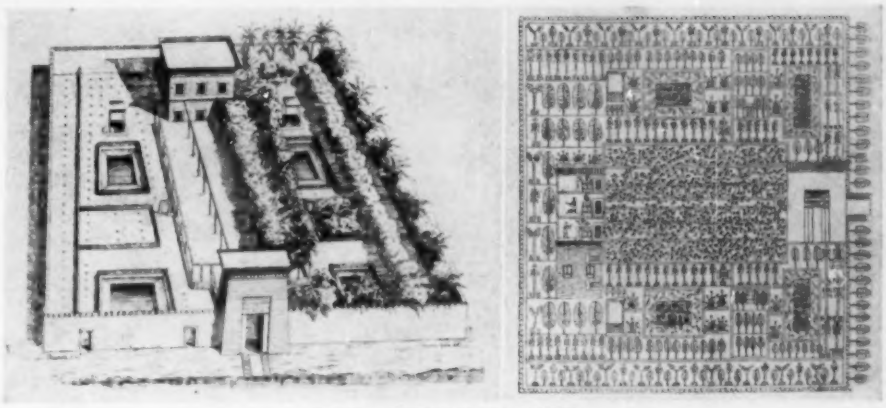
wooden ventillators which one finds so often in Egypt; usually there were erected there one or two isolated rooms, serving as the laundry or as a dormitory for the slaves or the watchmen. The terrace and the court played a large part in the domestic life of the ancient Egyptians; there the women made the bread, cooked, and chatted in the open air; the whole family slept there in summer, protected by nets from the attacks of mosquitoes.

Mansions of the Wealthy

The mansions of the wealthy and of the lords covered a considerable extent: they were usually situated in the midst of a garden or a planted court, and presented to the street, like the houses of the common people, only walls, crenellated like those of a fortress. The domestic life was hidden and as it were turned in upon itself: they sacrificed the pleasure of seeing passersby to the advantage of never being seen from the outside. Only the gate told something of the importance of the family which hid itself behind the walls. It was preceded by a flight of two or three steps, or a portico with a colonnade ornamented with statues, which gave it a monumental appearance; sometimes there was a pylon like those which marked the entrance to the temples.

The interior was arranged like a little village, divided into sections by irregular walls: the dwelling house at the back, the granaries, the stables, the servants' quarters distributed about the various parts of the enclosure, according to rules which still escape us. The details of the arrangement seem to vary infinitely; to give an idea of the mansion of a great Egyptian lord, part palace, part villa, I can do no better than to reproduce two of the many plans which the tombs of the XVIIIth dynasty have preserved for us.

The first represents a Theban house. The enclosure is a square surrounded by a crenellated wall. The principal gate opens from a road bordered by trees, which runs along a canal or a branch of the Nile. The garden is divided into symmetrical compartments by low walls of dry stones, similar to those which one often sees in the large gardens of Akhim or Girgeh; in the center, a huge arbor is supported on four rows of small columns; on the right and left, four pools of water inhabited by ducks and geese, two tree-nurseries, two summer-houses, and paths bordered by sycamores, date-trees and palms; at the back, facing the gate, a two-story house of small dimensions, surmounted by a painted cornice.



THE THEBAN HOUSE

The plan of this house, shown on the right, was found in a tomb in Thebes. It represents the small but comfortable establishment of a well-to-do citizen. The grape arbor fills the center of the "front yard." It is flanked by tree-bordered walks surrounding four duck-ponds, and even the ducks on the water may be seen in the plan. Maspero's perspective drawing on the left shows how the house looked, with and without the shrubbery.

The Palace of Aï

The second plan is taken from the hypogee of Tell-el-Armana. It shows us a house, situated in the rear of the gardens of a great lord, Aï, son-in-law of the Pharaoh Khouniaton and, later, himself ruler of Egypt. An oblong pool extends in front of the gate: it is bordered by a gently sloping platform provided with two staircases. The form of the building is a rectangle longer across the front than along the sides. A great gate opens in the center and gives access to a court planted with trees and bordered with storerooms filled with provisions: two small courts placed symmetrically in the elongated corner rooms serve as stair-wells for the steps which lead to the terrace. This first building forms an envelope around the lodgings of the master. The two facades are ornamented with a portico of eight columns, interrupted in the middle by the opening for the grand doorway. Crossing the threshold, one came out into a sort of long central corridor, cut by two walls pierced with gates so as to form three courts in a row. The one in the center was bordered by rooms; the other two communicated on the right and left with two smaller courts, where the stairways which lead to the terrace are placed. This central building was what the texts call the *akhonouti*, the private dwelling of the king and the great lords, where the family and their closest friends alone had the right to enter. The number of terraces, the arrangement of the facade, differed according to the caprice of the proprietor. Most frequently the facade was single; sometimes it was divided into three parts, with the middle part projecting. Again, the two wings may be ornamented by a porch on each floor, or surmounted by a sun-room; the central pavillion sometimes looks like a tower which dominates the rest of the building. The facades are frequently decorated with long slender columns of painted wood which have no function and serve merely to enliven the somewhat plain appearance of the building. The interior arrangement is scarcely known; as in the common people's houses, the bedrooms were probably small and ill-lighted; but, on the other hand, the reception rooms seem to have had at least the dimensions still used today in Egypt, in the Arabian houses. The ornamentation of the walls does not admit of scenes or pictures like those which we find in the tombs. The panels were whitewashed or covered with a uniform tint and bordered with a multi-colored band. The ceilings were ordinarily left white; but sometimes they were decorated with geometrical ornaments.

"Even the cook and the cabin-boy learned to navigate the ship when

Bowditch

was on board." His "New American Practical Navigator" first appeared in 1802. The latest edition is 1931.

An extract from the first edition will be

THE NEXT CLASSIC OF SCIENCE

ENGINEERING

Coal Dust Explosions Drive Motor for Power Plants

New Internal Combustion Engine Will Also Burn Ground-up Wood and Vegetable Powders

EXPLOSIONS of coal dust, often the cause of great disasters, have been confined in the cylinder of an internal combustion engine and made to behave so in obedience to the command of the engineer that they give promise of becoming one of the chief power sources of the world. At least this is what the inventor of the new dust motor, Rudolph Pawlikowski of Gorlitz, Germany, believes.

Before the Third International Conference on Bituminous Coal, Herr Pawlikowski described his latest work, changing the ignitionless, crude oil-burning or Diesel type of internal combustion engine into one which will use coal dust for fuel.

After twenty years of research on a problem that has baffled hundreds of inventors, the German engineer believes his laboratory has at last developed a motor that will be a more economical stationary producer of power than either the steam turbine or the Diesel engine and will eventually replace gasoline motors in automobiles.

These new dust motors have been run thousands of hours and now they are being subjected to experiment and production by laboratories other than the one in which they were developed. Herr Pawlikowski said that motors of 600 horsepower and larger may be on the market by the first of the year.

The immediate application of the motor is expected to be mainly in countries such as Germany where the cost of oil for Diesel engines is high and where it is wise to conserve coal. To operate a 10,000 kilowatt power plant in Germany for one year, Herr Pawlikowski said, Diesel oil would cost 1,480,000 marks, coal for steam generation 470,000 marks, and coal dust for a motor only 336,000 marks. The installation cost of the dust motor, however, would be higher than that for the Diesel but not as great as the cost of building a steam plant.

"The dust motor," Herr Pawlikowski summarized, "produces a kilowatt-hour for about 26 per cent. less than the steam turbine. The saving made by this engine is so great that it certainly will not be surpassed by any improvement in the Diesel engine, and probably not by the steam turbine, even with improvements in steam operation."

Coal pulverized for burning under boilers explodes satisfactorily in the cylinder-head of the dust motor. Italian sanzza, a meal made of the residue left from the manufacture of olive oil, and ground-up wood have operated the motor just as well. Cheap vegetable powders for which there is little use, such as those from palm kernels, sunflower seed, rape, hemp, peanuts and soya beans, were recommended as good motor fuels.

The dust motor is essentially a Diesel engine with the addition of an auxiliary chamber in which the dust fuel is prepared for admission to the cylinder head where it is compressed and exploded.

Science News Letter, December 5, 1931

ZOOLOGY

Same Parasite Infests Four Animal Groups

ONE PEST that infests four different animal groups, of only the remotest zoological relationships, has been discovered by Nelly J. Bosma of the University of Michigan. The parasite, a worm, is described in *Science*. At different stages of its life it is to be found successively in snails, tadpoles and frogs, mammals like raccoon, mouse, etc., and again in mammals like weasel, cat, dog or ferret. It must have four such unwilling hosts during its life. A parasite life-cycle complicated as this is of the greatest rarity.

Science News Letter, December 5, 1931

GEOLOGY

Present Geyser Action Theory Needs Changing

THE PRESENT accepted theory of geyser action, dating back in its inception about 85 years, must be modified in a number of points, Dr. E. T. Allen of the Carnegie Institution of Washington, holds.

The classic theory has been that water, flowing into the geyser tube or well, becomes heated at the bottom by volcanic steam from below, finally becoming superheated and flashing into a steam explosion when a little water at the top "slops over." But Dr. Allen points out that not all geysers "slop over" before they erupt.

Furthermore, many geysers have hotter water half-way down their wells than they have at the bottom. This points strongly at a probability of the heating steam or gases coming in from a side source instead of from the bottom.

It seems likely, also, that some geysers get not only steam, but at least some of their hot water as well, from side sources. This is evidenced by the measurement of the amount of water discharged during an eruption, which with some geysers, amounts to a great deal more than the well itself will hold.

Science News Letter, December 5, 1931

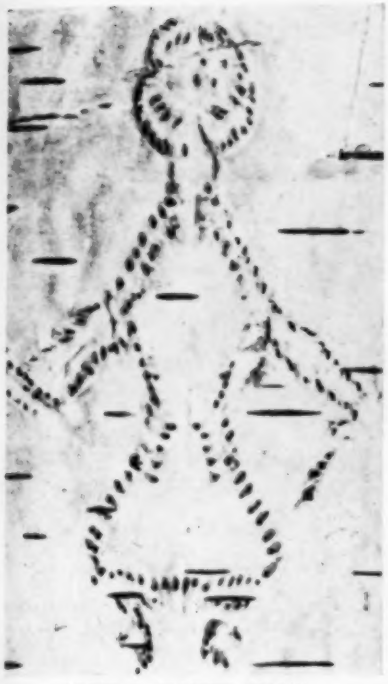
CHEMISTRY

British Report Most Potent Form of Vitamin D Yet Known

A CRYSTALLINE form of vitamin D, more potent in its ability to prevent and cure rickets than any similar preparation now known, has just been prepared by a group of scientists working at the National Institute for Medical Research in London.

The men who have made this remarkable scientific contribution are Drs. F. A. Askew, H. M. Bruce, R. K. Callow, J. St. L. Philpot and T. A. Webster. The leader of the group, Dr. R. B. Bourdillon, was prevented by illness from taking active part in the last stage of the work.

This new form of vitamin D is called "calciferol" by its discoverers. They say of it:



NOT A PAPER DOLL

But an example of the lost Indian art of biting designs in birch bark. Here is an Indian woman dancing. She is an old woman, it appears, for her shoulders droop and her knees take the bending step without any lively spring.

"The antirachitic activity of calciferol is the highest yet recorded in known units for any preparation."

Calciferol has more of this antirachitic potency than the crystalline preparation of vitamin D recently reported by the German Nobel Prize winner, Prof. Adolf Windaus of Goettingen, Germany, the British investigators state in their report to *Nature*.

Prof. Windaus has two vitamin D substances which he calls vitamin D_1 and vitamin D_2. Calciferol is not the same as D_1, but is much like vitamin D_2 in such physical properties as have been described. Prof. Windaus' vitamin D_2, however, has approximately the same activity against rickets as D_1. In this it differs from calciferol, which has much greater antirachitic activity than D_1, the British scientists found. Consequently, they concluded that the two substances, calciferol and D_2, are not identical.

Calciferol has been proved by them to be a direct product of the irradiation of ergosterol, known for some time as the parent substance of vitamin D. It has the same elements in the same relative proportion as ergosterol, although the structure of its molecule may be different from that of ergosterol.

Science News Letter, December 5, 1931

ETHNOLOGY

Biting Birch Bark Designs Was Indians' Lost Art

Museum Gets Specimens Covered With Delicate Patterns Which Cannot Be Duplicated by Chippewa Women Today

EVIDENCE of a real "lost art" which once flourished among Chippewa Indians around Lake Superior has been brought to the Smithsonian Institution by Frances Densmore, collaborator for the Institution. Miss Densmore, who has studied the customs of the Chippewas on their reservations, has collected about 170 specimens of the lost art. The U. S. National Museum has just acquired a portion of the collection.

The specimens are small pieces of birch bark covered with delicate patterns. They were made by Chippewa women, who took birch bark as soft and pliable as tissue paper and folded it and bit the designs with their teeth. Some of the outlines represent rows of dancing Indians, rather like the rows of paper dolls, all alike, that children cut out of folded paper. Other pieces of bark are marked with geometric patterns, like the lace mats that can be cut out of a square of paper folded again and again. When held to the light the bark pictures make attractive transparencies.

This trick of biting a design with little, neat, precise cuts is one that the younger generations of Chippewas cannot achieve, declares Miss Densmore. It is truly a lost art. Nor can the young Chippewa women keep in mind an elaborate pattern that is to be produced. That fine art of clear thinking, too, is lost. A woman of older Chippewa generations could think out a design of butterflies, leaves, beavers, or other nature forms, and then fold the bark—even as many as 24 folds—and without hesitation transfer the mental picture to the folded bark, perfect. When a young Chippewa today tries a hand at the old art, she "nibbles" the bark, leaving a heavy, patchy line, which betokens her mental uncertainty as much as her lack of dental skill.

The lost art of biting pictures in bark died out at least 50 years ago, Miss Densmore estimates. How long ago the pictures were first made is uncertain. When the Chippewa women brought out samples of the old art to show to Miss Densmore, they told how they thought the art began.

Some woman was sitting on the ground by a wigwam or campfire, they said. She picked up a broad leaf or piece of soft bark and idly folded it and bit a few lines into it. She looked at it and showed the others. So, other women tried it, and competition arose. The art flourished especially in the sugar camps, early in spring, when birch tree bark is suitably pliant.

Miss Densmore points out that the Indian has sometimes been called lacking in purely aesthetic art. It has been asserted that Indian art was employed to make useful things beautiful. But the transparencies are evidence that the Indian could and did produce art for art's sake. The little transparencies, like water-color sketches, were handed about and displayed in the firelight of the wigwams at night, and were treasured for years by the owners, merely because it was pleasant just to look at them.

Science News Letter, December 5, 1931

METEOROLOGY

Trees Will Die Unless Heavy Rains Fall

WHILE the drought of 1930, the severest on record, has been officially "broken," the rains have been insufficient to replenish the sub-soil moisture necessary to the life of deep-rooted trees. Unless the rains this winter are especially heavy next year will see increasingly large numbers of dead and dying trees. Already many of those which line the driveways in and around Washington, D. C., have succumbed to the lack of moisture.

Latest reports from the U. S. Weather Bureau show that southeastern United States, from Maryland down to northern Florida, is at present experiencing very dry conditions. South Carolina, Georgia, and eastern Alabama are especially hard hit. Tennessee, Kentucky, northern Arkansas, and parts of Illinois, however, have had good rains.

Science News Letter, December 5, 1931

PHYSICS

Ball Lightning, Old Puzzle to Science, Made out of Smoke

A GHOSTLY lump of the ball lightning that has till now baffled the efforts of scientists to understand it, has been made in the laboratory of Leeds University in England by Drs. W. Cawood and H. S. Patterson. Or at least something very like it has been made.

The artificial thunderbolt was a glowing red ball, eight inches in diameter. It appeared while the experimenters were passing an electrostatic "brush" discharge through a smoke cloud.

Electrically charged particles, of opposite sign to the other particles of the smoke, formed the ball. It was kept suspended in the center of their hundred cubic foot glass chamber, the experimenters believe, by the electrical repulsion of the inside walls.

Globular or ball lightning is one of the rarest and most puzzling of natural phenomena. Entering a home by the window or down the chimney, this dazzling red, blue or white, round or pear-shaped ball floats in the air or runs along the floor. The lightning ball may crackle or hiss, but it seldom does any harm. Sometimes it is observed dropping like a stone from a thunder cloud along the path of previous ordinary lightning flashes.

Dr. W. J. Humphreys of the U. S. Weather Bureau recently issued an appeal for detailed descriptions of the phenomenon from all persons who have observed it.

That the artificial lightning ball was movable and electrically charged was shown by Drs. Cawood and Patterson when they inserted an electrified wire into the vessel. Chains of the smoke particles formed the ball, it was shown under the microscope.

Evaporation of various substances into the space was the method of forming the smokes or "aerosols," one with the formidable name of "para-xylene-azo-beta-naphthol" being found most suitable.

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PHYSIOLOGY

Soporific Drug Numbs Brain But Goes Chiefly to Muscles

ALTHOUGH the brain is the part of the body chiefly acted upon by the bromides, hypnotic and sleep-inducing drugs, it is not the spot of highest concentration of these drugs, a report of the American Medical Association shows.

This newly-discovered fact upsets one theory of the action of such drugs. It had been supposed that when a bromide was given, most of the drug went to the tissues of the brain and nervous system, and that that was why it had such a direct effect on them. The efficiency of sodium or potassium bromide in the treatment of epilepsy was considered a matter of saturation of the specific tissue with the drug.

M. A. B. Toxopeus of the Utrecht Pharmacologic Institute in Holland recently investigated the distribution of sodium bromide when given in moderately large doses to dogs. He found most of the drug, over one-third of it, in the muscles. Next largest amount was found in the skin, then came the blood. The brain stood eighth or ninth in order, with the bones, lungs, heart, liver and kidneys coming ahead of it. The muscles were found to contain from one and one-half to five times the concentration of the bromide which Mr. Toxopeus discovered in the brain.

The mechanism of the action of bromide remains unexplained, but it appears certain that it is not due to special selectivity of the nervous system for the bromide ion, according to comment by the American Medical Association.

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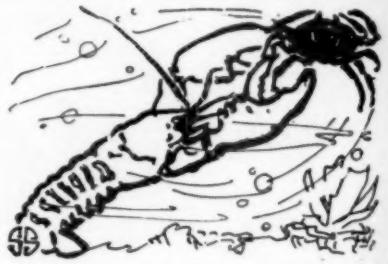
ZOOLOGY

Nature Ramblings

By FRANK THONE



Deep Sea Drama

JULES VERNE, H. G. Wells, and many another writer of hair-raising romances have scored their best successes either by magnifying some small monster and introducing him into the human world, or else have ventured down, as minified spectators, into the arenas of desperate struggle that go on in the lesser world every hour of every day. The insects live a fierce and terrible life of their own, as Fabre has shown us, but it is beneath the blank surface of the sea and other waters of the earth that the frantic game of eat and be eaten goes on at its greatest intensity.

In the American Museum of Natural History in New York City there is a beautifully arranged group that shows the climax of one of these silent dramas of the underwater world. A crab has been sliding along over the bottom, with an eye to a possible meal among the fronds of a clump of seaweed nearby. But as he has neared this little submarine grove, a terrible, bloodthirsty monster has pounced out on him—no less terrible because it is a cousin-animal, the lobster. Little this clawed Goliath recks of near-cannibalism. The sudden lurch of the crab, its attempted escape by swimming, have come an instant too late. The great pincers of the lobster have seized its shell, and in a moment more will have crushed it in. Then the big-toothed member of the pair will finish the work of hacking the poor crab to bits, while the finer-toothed claw will stuff the fragments into the lobster's avid mouth.

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Among the game animals of Tennessee are listed a herd of goats which reverted to the wild, and scores of hogs which have roamed the hills for years.

PHYSICS

Universe Rushing Outward May be Optical Illusion

THE EXPLODING universe, fearsome picture presented by modern astronomy, may be an optical illusion, Dr. Herbert J. Brennen, of Northwestern University, suggested to the American Physical Society in Chicago.

The ten thousand miles per second speed with which the distant nebulae are rushing away from our telescopes, has been one of the outstanding mysteries of modern physics, baffling even Einstein, Dr. Brennen explained.

Abnormal redness of the light reaching us from the distant stars, on which this picture is based, may, however, be explained as a purely gravitational effect, requiring no expansion of the universe, said Dr. Brennen. The gravitational pull of the universe itself may cause this effect on the light traversing it.

The "red shift," as this displacement of the spectral lines towards longer wavelengths is called, which is found to be greater the greater the distance of the nebula, has been explained by the Abbé Lemaître, in terms of the Doppler effect, Dr. Brennen said. According to this, the extent of the abnormal redness of a star is a measure of the speed with which it is bursting away from us.

Dr. Brennen, by assuming nebulae hundreds of thousands of light years in radius, has derived mathematical equations that give a gravitational red-shift proportional to the distance of the star, in accord with the observations of astronomers.

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• First Glances at New Books

Meteorology

SNOW CRYSTALS—Wilson A. Bentley and W. J. Humphreys—*McGraw-Hill,* 227 p., $10. For over forty years Wilson Bentley has captured beauty out of the gray heavens of Vermont winters with a home-made microscope-camera setup and a technique that the cherubim might envy. Now, at long last, over two thousand of his marvellous snow-crystal pictures, together with a few fine frost, dew and ice photographs, have been assembled into a superb book. Scientists and artists who knew of Bentley's work breathe easier, for the fruits of his labor are safe against loss, are preserved for the admiration of the future, are available to a wider present audience. The jewelry of the skies which this book sets forth on page after incredible page will without question inspire designers in media all the way from platinum to linoleum, will interest and instruct in a score of sciences, and will bring sheer delight to lovers of beauty everywhere.

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Nature Study

ALONG THE BROOK—R. T. Fuller—*John Day,* 81 p., $1.50. Small enough to slip into a pocket without adding appreciable weight, this little book has a good deal of well-packed information in it about the animal and plant life to be found in and on the banks of those slender streamlets that most invite our feet when out on an autumn ramble. The line illustrations are simple and clear-cut.

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Zoology

COMMON PESTS—R. W. Doane—*Thomas,* 397 p., $4. This book is written from an original viewpoint: it discusses the commoner animal organisms of whatever group that cause man discomfort or loss. Hence it includes creatures as diverse as mosquitoes and mice, horseflies and hawks; with each it tells what to do about it. The book should therefore be useful to the average bepestered householder, as well as to the teacher desiring a good but compact single volume for his laboratory reference shelf.

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Psychology

FIELDS OF PSYCHOLOGY—Glenn Devere Higginson—*Holt,* 613 p., $2.75. A textbook on psychology covering a very broad field including evolution, heredity, animal psychology, group psychology, various applications of psychology in education, busines, and the legal profession, and abnormal psychology. An introductory section discusses the different modern schools of psychology.

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Archaeology

COLUMBUS CAME LATE—Gregory Mason—*Century,* 341 p., $4. Describes with many vivid touches the civilization attained by American Indians before white men came and began to enlighten the New World. Tropical and subtropical groups occupy the foreground. These were the Indians who forged ahead most strongly in achievement, and it is the author's aim to show that America, though isolated, was keeping up with the march of world civilization in ancient times.

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Psychology

PERSONALITY AND WILL—Francis Aveling—*Appleton,* 246 p., $2. An English psychologist has here attempted to reach a definition of personality and to determine the relation between personality and will. "The intrinsic principle of personality," he says, "is simply intelligent will."

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Medical Economics

A SURVEY OF THE MEDICAL FACILITIES OF THE CITY OF PHILADELPHIA: 1929—Nathan Sinai and Alden B. Mills—*University of Chicago Press,* 298 p., $1.50. A publication of the Committee on the Costs of Medical Care. Said to be the first complete survey of the medical facilities of a large American city. The report should be particularly interesting because Philadelphia is one of the large medical centers of the country, with numerous and good medical facilities. Part of this report is a digest of the Philadelphia Hospital and Health Survey, 1929, and part is the result of original investigation.

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Economics

PETROLEUM FACTS AND FIGURES—*American Petroleum Institute,* 268 p., $2. The fourth edition of the American Petroleum Institute's annual statistical summary of the industry.

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Psychology-Business

FOUNDATIONS FOR HUMAN ENGINEERING—Charles R. Gow—*Macmillan,* 226 p., $2. The contents of this volume represent approximately the first third of the course in humanics as offered at the Massachusetts Institute of Technology. The author who was formerly a successful construction engineer here offers in humorous style some practical wisdom regarding the human element with which the engineer and others in the business world must work.

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Zoolinguistics

SPRECHEN SIE SCHIMPANSISCH?—Georg Schwidetzky—*Lühe u. Co., Leipzig,* 80 p., RM 3.40. "Do you speak Chimpanzee?" the author asks, and assures the reader that he does. He holds that there are many words in modern High German and other languages that are derived from the primitive "words" of simian languages, like the "ngak" and "nkak" of the chimpanzee. The present brochure is announced as the prodrome of an ambitious effort to show what the first human speech was like by a study of animal sounds.

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Physics

THERMODYNAMICS—A. W. Porter—*Dutton,* 96 p., $1.10. Another of the series of monographs on physical subjects edited by Dr. B. L. Worsnop, King's College, London. The text is closely condensed and carries references for additional reading.

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Psychology

THE PSYCHOLOGY OF THE INVENTOR—Joseph Rossman—*Inventors Publishing Co.,* 252 p., $3. Based on questionnaires on the inventive process filled out by over seven hundred leading inventors of the United States.

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Parasitology

KEY-CATALOGUE OF THE PROTOZOA REPORTED FOR MAN, Second Edition—C. W. Stiles and Albert Hassall—*Government Printing Office,* 63 p., 15c. The conclusiveness of the taxonomic work performed by the senior author, and inspired by him in his associates, is attested here by the fact that this second edition is an almost unchanged reprinting of the first, which bears a 1925 publication date.

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